OFFICE OF THE DIRECTOR
DEFENSE RESEARCH AND ENGINEERING
3040 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-3040

July 2, 2003

MEMORANDUM FOR High Performance Computing Advisory Panel

SUBJECT: Selection of FY 2004 Department of Defense (DoD) High Performance Computing (HPC) Challenge Projects

I am pleased to announce the selection of the FY 2004 DoD HPC Challenge Projects. These projects address the Department's highest priority needs in science and technology and test and evaluation, and will take advantage of extensive new HPC capabilities at our major shared resource centers and distributed centers.

Based upon the recommendation of the Challenge Project Review Board, I approve the continuation of all 24 previously selected multi-year Challenge Projects (listed in attachment 1) and 10 new Challenge Projects (listed in attachment 2). The new projects were selected from the 26 proposals submitted by your components in response to the annual call for Challenge Project proposals. Competition was especially fierce this year; there were many high-quality projects that we simply could not select and remain within the overall resource allocation targets for Challenge Projects. I urge you to provide robust allocations for the set of Challenge Project proposals that we were not able to select.

The 34 FY 2004 Challenge Projects have all been subjected to extensive peer review resulting in top evaluations. The High Performance Computing Modernization Program Office (HPCMPO) will soon be providing you with the computational time allocated for each Challenge Project to be implemented on October 1, 2003. Once again, the HPCMPO will evaluate the progress being made on each on-going Challenge Project and incorporate the results of this evaluation into the FY 2005 selection process.

Congratulations to your participating organizations on proposing successful DoD Challenge Projects. I expect that the results of these efforts will provide critically important and highly visible examples of how high performance computing produces military advantage for the warfighter. My point-of-contact for this activity is the HPCMP Deputy Director, Larry Davis, at (703) 812-8205, e-mail address larryd@hpcmo.hpc.mil.

/Signed/
Cray J. Henry
Director, High Performance Computing
Modernization Program Office

Attachments:
As stated

Attachment 1
Continuing DoD Challenge Projects in FY 2004

1. Directed High Power RF Energy: Foundation of Next Generation Air Force Weapons – Air Force Research Laboratory – Keith Cartwright (six-month continuation)

2. Signature Modeling for Future Combat Systems – Army Research Laboratory and Army Tank-Automotive Research Development and Engineering Center – Raju Namburu

3. High Fidelity Analysis of UAVs Using Nonlinear Fluid/Structure Simulation – Air Force Research Laboratory – Reid Melville and Miguel Visbal

4. High-Fidelity Simulation of Littoral Environments – Naval Research Laboratory and Army Engineering Research and Development Center – Richard Allard and Jeffrey Holland

5. Sesmic Signature for Tactical Ground Sensor Systems and Underground Facilities – Army Engineering Research and Development Center – Mark Moran

6. Multiscale Simulation of Nanotubes and Quantum Structures – Office of Naval Research – Jerry Bernholc

7. Multi-Scale Simulations of High Energy Density Materials – Air Force Research Laboratory – Jerry Boatz

8. Basin-scale Prediction with the Hybrid Coordinate Ocean Model – Office of Naval Research – Eric Chassignet

9. Time-Accurate Aerodynamics Modeling of Synthetic Jets for Projectile Control – Army Research Laboratory – Jubaraj Sahu

10. Computational Chemistry Models Leading to Mediation of Gun Tube Erosion – Army Research Laboratory – Cary Chabalowski and Edward Byrd

11. Large-Eddy Simulation for Tip-Clearance Flow in a stator-Rotor Combination – Office of Naval Research – Parviz Moin

12. Evaluation and Retrofit for Blast Protection in Urban Terrain – Army Engineering Research and Development Center – James Baylot

13. First Principles Studies of Technologically Important Smart Materials – Office of Naval Research – Andrew Rappe

14. Numerical Modeling of Turbulent Wakes in Ambient Shear and Stratification for Naval Applications – Office of Naval Research – Joseph Werne

15. 3-D CFD Modeling of the Chemical Oxygen-Iodine Laser II – Air Force Research Laboratory – Timothy Madden

16. Simulation of Coherent Radar Backscatter from Dynamic Sea Surfaces – Naval Research Laboratory – Jakov Toporkov

17. Modeling Complex Projectile-Target Interactions II – Army Research Laboratory – Kent Kimsey

18. Defense against Chemical Warfare Agents (CWAs) and Toxic Industrial Chemicals (TICs): Filtration, Prophylaxis and Therapeutics – Army Research Laboratory – Margaret Hurley, Jeffrey Wright and Alex Balboa

19. Multidisciplinary Applications of Detached-Eddy Simulation to Separated Flows at High Reynolds Numbers – Air Force Academy – Scott Morton

20. Three-Dimensional Modeling and Simulation of Weapons Effects for Obstacle Clearance – Naval Surface Warfare Center – Alexandra Landsberg

21. Computational Support for Chemically Reactive Flows and Non-ideal Explosives – Defense Threat Reduction Agency – Joseph Crepeau

22. Time Accurate Unsteady Simulation of the Stall Inception Process in the Compression System of a US Army Helicopter Gas Turbine Engine – Army Research Laboratory – Michael Hathaway

23. Stochastic Simulations of Flow-Structure Interactions – Office of Naval Research – George Em Karniadakis

24. Towards Predicting Scenarios of Environmental Arctic Change (TOPSEARCH) – Naval Postgraduate School – Wieslaw Maslowski

Attachment 2
New DoD Challenge Projects for FY 2004

1. Scalable Multiscale Simulations of Material Behavior at the Nanoscale – Army Research Office – Rajiv K. Kalia, Aiichiro Nakano and Priya Vashishta

2. Computational Fluid Dynamics (CFD) in Support of Wind Tunnel Testing for Aircraft/Weapons Integration – Arnold Engineering Development Center – Bill Sickles

3. Computational Simulations of Combustion Chamber Dynamics and Hypergolic Gel Propellant Chemistry for Selectable Thrust Engines in Next Generation Guided Missiles – Army Research Laboratory – Michael Nusca and Michael McQuaid

4. Hypersonic Scramjet Technology Enhancements for Long Range Interceptor Missile – Army Aviation and Missile Command – Kevin Kennedy

5. Tip-to-Tail Turbulent Scramjet Flowpath Simulation with MHD Energy Bypass – Air Force Research Laboratory – Datta Gaitonde

6. High Accuracy DNS and LES of High Reynolds Number, Supersonic Base Flows and Passive Control of the Near Wake – Army Research Office – Hermann Fasel

7. Hybrid RANS-LES for High Fidelity Simulation of Circulation Control Schemes for Navy Applications – Office of Naval Research – Eric Paterson, Robert Kunz and Leonard Peltier

8. Toward a High-Resolution Global Coupled Navy Prediction System – Naval Postgraduate School – Julie McClean

9. Dynamic Rotorcraft Simulations for Accurate Interactional Aerodynamics and Performance Prediction – Army Aviation and Missile Command – Mark Potsdam

10. Distributed Pump Jet Propulsion (DPJP) for Submarines – Office of Naval Research – Joseph Gorski and Robert Kunz